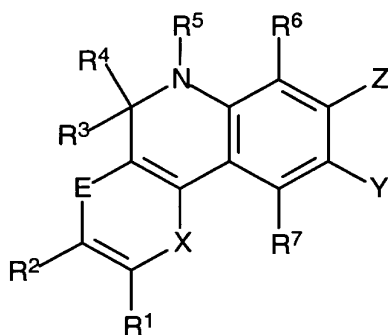


## CLAIMS

We claim

- 5     1.     A compound having a formula



10     wherein

R<sup>1</sup> and R<sup>2</sup> are independently selected from the group consisting of hydrogen, cyano, halogen, carboxylic acid, sulfonic acid, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, aryl, heteroaryl, -L-R<sub>x</sub> and -L-S<sub>C</sub>, wherein said alkyl or alkoxy is optionally substituted by carboxylic acid, sulfonic acid, or halogen and said aryl or heteroaryl is optionally substituted one or more times by C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> perfluoroalkyl, cyano, halogen, azido, carboxylic acid, sulfonic acid, or halomethyl;

or R<sup>1</sup> in combination with R<sup>2</sup> forms a fused aromatic or heteroaromatic ring that is optionally sulfonated one or more times, or said ring is substituted by -L-R<sub>x</sub> or -L-S<sub>C</sub>;

or R<sup>2</sup> in combination with R<sup>3</sup> forms a 5- or 6-membered alicyclic ring;

R<sup>3</sup> and R<sup>4</sup> are independently selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>6</sub> alkyl, aromatic or heteroaromatic ring, -L-R<sub>x</sub> and -L-S<sub>C</sub>, wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, hydroxy, or halogen and said aromatic or heteroaromatic ring is optionally substituted one or more times by C<sub>1</sub>-C<sub>6</sub>

alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, C<sub>1</sub>-C<sub>6</sub> perfluoroalkyl, cyano, halogen, carboxylic acid, sulfonic acid, or halomethyl;

or R<sup>3</sup> in combination with R<sup>4</sup> forms a 5- or 6-membered alicyclic ring;

5

R<sup>5</sup> is independently selected from the group consisting of hydrogen, methyl, carboxymethyl, C<sub>2</sub>-C<sub>6</sub> alkyl, aryl, heteroaryl, -L-R<sub>x</sub> and -L-S<sub>C</sub>, wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen and said aryl or heteroaryl is optionally substituted one or more times by C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> perfluoroalkyl, cyano, halogen, carboxylic acid, sulfonic acid, or halomethyl;

10

R<sup>6</sup> is independently selected from the group consisting of hydrogen, cyano, halogen, carboxylic acid, sulfonic acid, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, aryl, heteroaryl, -L-R<sub>x</sub> and -L-S<sub>C</sub>, wherein said alkyl or alkoxy is optionally substituted by carboxylic acid, sulfonic acid, or halogen and said aryl or heteroaryl is optionally substituted one or more times by C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> perfluoroalkyl, cyano, halogen, azido, carboxylic acid, sulfonic acid, or halomethyl;

15

or R<sup>4</sup> in combination with R<sup>5</sup>, or R<sup>5</sup> in combination with R<sup>6</sup>, forms a 5- or 6-membered alicyclic ring;

20

R<sup>7</sup> is independently selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, -L-R<sub>x</sub> and -L-S<sub>C</sub>;

25

one of X and E is O, S, NR<sup>8</sup>, or CR<sup>1'</sup>=CR<sup>2'</sup>, and the other is absent;

wherein R<sup>8</sup> is independently selected from the group consisting of hydrogen, methyl, carboxymethyl, C<sub>2</sub>-C<sub>6</sub> alkyl, -L-R<sub>x</sub> and -L-S<sub>C</sub>, wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen; and

30

R<sup>1'</sup> and R<sup>2'</sup> are independently selected from the group consisting of hydrogen, cyano, halogen, carboxylic acid, sulfonic acid, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, aryl, heteroaryl, -L-R<sub>x</sub> and -L-S<sub>C</sub>, wherein said alkyl or alkoxy is optionally substituted by carboxylic acid, sulfonic acid, or halogen and said aryl or heteroaryl is optionally substituted one or more

times by C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> perfluoroalkyl, cyano, halogen, azido, carboxylic acid, sulfonic acid, or halomethyl;

5 Y is independently selected from the group consisting of H, OH, NH<sub>2</sub>, NO, -(CO)-R<sup>9</sup>, -(CO)-O-R<sup>10</sup>, wherein said R<sup>9</sup> and R<sup>10</sup> are independently H, C<sub>1</sub>-C<sub>6</sub> alkyl, or a substituted or unsubstituted aryl or heteroaryl ring system having 1-2 rings;

10 Z is independently selected from the group consisting of H, OH, NHR<sup>17</sup>, SH, or C(CR<sup>11</sup>R<sup>12</sup>)<sub>2</sub>OH; wherein said R<sup>17</sup> is a C<sub>1</sub>-C<sub>6</sub> alkyl that is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen and said R<sup>11</sup> and R<sup>12</sup> are independently C<sub>1</sub>-C<sub>6</sub> alkyl that are optionally substituted by carboxylic acid, sulfonic acid, or halogen, or R<sup>11</sup> and R<sup>12</sup> taken in combination form a 5- or 6-membered alicyclic ring;

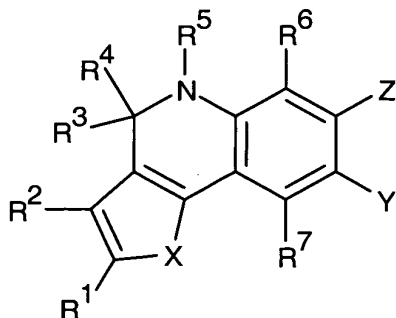
15 wherein L is a covalent linkage;

R<sub>x</sub> is a reactive group; and

S<sub>C</sub> is a conjugated substance.

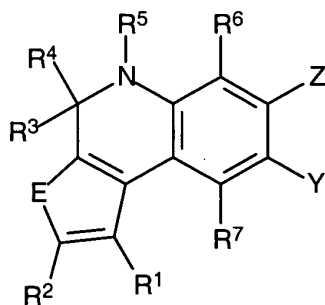
20 2. The compound according to Claim 1, wherein one of X and E is O, S, or CR<sup>1'</sup>=CR<sup>2'</sup>, and the other is absent.

3. The compound according to Claim 2, wherein said compound has the formula



25 wherein X is O or S.

4. The compound according to Claim 2, wherein said compound has the formula



5

wherein E is O or S.

5. The compound according to Claim 3, wherein X is S.

- 10 6. The compound according to Claim 1, wherein

R<sup>1</sup> is hydrogen or sulfonic acid;

R<sup>3</sup> and R<sup>4</sup> are each methyl;

15

R<sup>6</sup> and R<sup>7</sup> are each hydrogen or methyl; and

Z is OH.

- 20 7. The compound according to Claim 1, wherein Y is H or -(CO)-H or NO.

8. The compound according to Claim 1, wherein said L is independently a single covalent bond or a covalent linkage having 1-20 nonhydrogen atoms selected from the group consisting of C, N, O, P, and S.

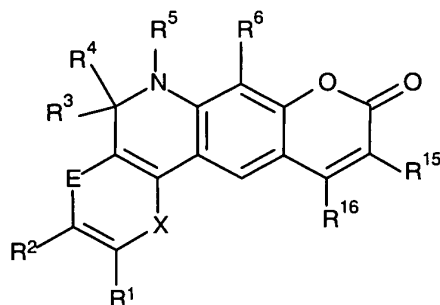
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9. The compound according to Claim 1, wherein said R<sub>x</sub> is independently selected from the group consisting of an acrylamide, an activated ester of a carboxylic acid, an acyl azide,

an acyl nitrile, an aldehyde, an alkyl halide, an amine, an anhydride, an aniline, an aryl halide, an azide, an aziridine, a boronate, a carboxylic acid, a diazoalkane, a haloacetamide, a halotriazine, a hydrazine, an imido ester, an isocyanate, an isothiocyanate, a maleimide, a phosphoramidite, a reactive platinum complex, a sulfonyl halide, and a thiol group.

10. The compound according to Claim 1, wherein said  $S_C$  is independently selected from the group consisting of an amino acid, a peptide, a protein, a tyramine, a carbohydrate, a metal chelating moiety, a nucleoside, a nucleotide, an oligonucleotide, a nucleic acid, a hapten, a psoralen, a drug, a hormone, a lipid, a lipid assembly, a polymer, a polymeric microparticle, a biological cell, and a virus.

11. A compound having a formula



wherein  $R^1$ ,  $R^2$ , and  $R^6$  are independently selected from the group consisting of hydrogen, cyano, halogen, carboxylic acid, sulfonic acid  $C_1$ - $C_6$  alkyl,  $C_1$ - $C_6$  alkoxy, aryl, heteroaryl,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl or alkoxy is optionally substituted by carboxylic acid, sulfonic acid, or halogen and said aryl or heteroaryl is optionally substituted one or more times by  $C_1$ - $C_6$  alkyl,  $C_1$ - $C_6$  perfluoroalkyl, cyano, halogen, azido, carboxylic acid, sulfonic acid, or halomethyl;

or  $R^1$  in combination with  $R^2$  forms a fused aromatic or heteroaromatic ring that is optionally sulfonated one or more times, or said ring is substituted by  $-L-R_x$  or  $-L-S_C$ ;

5  $R^3$  and  $R^4$  are independently selected from the group consisting of hydrogen,  $C_1$ - $C_6$  alkyl, an aromatic or heteroaromatic ring,  $L-R_x$  and  $-L-S_C$ , wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, hydroxy, or halogen and said aromatic or heteroaromatic ring is optionally substituted one or more times by  $C_1$ - $C_6$  alkyl,  $C_1$ - $C_6$  alkoxy,  $C_1$ - $C_6$  perfluoroalkyl, cyano, halogen, carboxylic acid, sulfonic acid, or halomethyl;

10 or  $R^2$  in combination with  $R^3$ , or  $R^3$  in combination with  $R^4$ , forms a 5- or 6-membered alicyclic ring;

15  $R^5$  is independently selected from the group consisting of hydrogen, methyl, carboxymethyl,  $C_2$ - $C_6$  alkyl, aryl, heteroaryl,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen and said aryl or heteroaryl is optionally substituted one or more times by  $C_1$ - $C_6$  alkyl,  $C_1$ - $C_6$  perfluoroalkyl, cyano, halogen, carboxylic acid, sulfonic acid, or halomethyl;

20 or  $R^4$  in combination with  $R^5$ , or  $R^5$  in combination with  $R^6$ , forms a 5- or 6-membered alicyclic ring;

25 one of X and E is O, S,  $NR^8$ , or  $CR^{1'}=CR^{2'}$  and the other is absent;

30 wherein  $R^8$  is independently selected from the group consisting of hydrogen, methyl, carboxymethyl,  $C_2$ - $C_6$  alkyl,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen; and

$R^{1'}$  and  $R^{2'}$  are independently selected from the group consisting of hydrogen, cyano, halogen, carboxylic acid, sulfonic acid,  $C_1$ - $C_6$  alkyl,  $C_1$ - $C_6$  alkoxy, aryl, heteroaryl,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl or alkoxy is optionally substituted by carboxylic acid, sulfonic acid, or halogen and said aryl or heteroaryl is optionally substituted one or more times by  $C_1$ - $C_6$  alkyl,  $C_1$ - $C_6$  perfluoroalkyl, cyano, halogen, azido, carboxylic acid, sulfonic acid, or halomethyl;

R<sup>15</sup> and R<sup>16</sup> are independently selected from the group consisting of hydrogen, cyano, nitro, halogen, carboxylic acid, sulfonic acid, C<sub>1</sub>-C<sub>6</sub> alkyl, an aromatic or heteroaromatic ring system having 1-2 fused rings, -L-R<sub>x</sub> and -L-S<sub>C</sub>, wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, or halogen and said aromatic or  
5 heteroaromatic ring system is optionally substituted one or more times by C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> perfluoroalkyl, cyano, halogen, carboxylic acid, sulfonic acid, or halomethyl;

wherein L is a covalent linkage;

10 R<sub>x</sub> is a reactive group; and

S<sub>C</sub> is a conjugated substance.

12. The compound according to Claim 11, wherein said one of X and E is O or S.

15

13. The compound according to Claim 12, wherein

R<sup>6</sup> and R<sup>7</sup> are hydrogen;

20 R<sup>3</sup> and R<sup>4</sup> are each methyl;

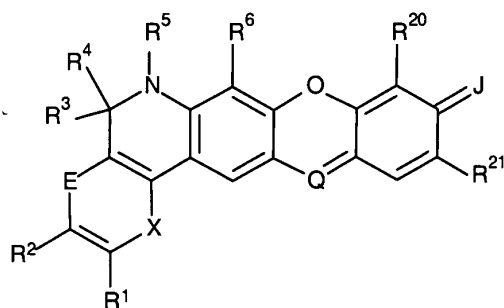
R<sup>1</sup> is hydrogen or sulfonic acid;

25 one of R<sup>15</sup> and R<sup>16</sup> is -L-R<sub>x</sub> or -L-S<sub>C</sub>, and the other is hydrogen, C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> perfluoroalkyl; or cyano;

wherein L is a single covalent bond, or L is a covalent linkage having 1-20 nonhydrogen atoms selected from the group consisting of C, N, O, P, and S, and  
wherein R<sub>x</sub> is independently selected from the group consisting of an acrylamide, an  
30 activated ester of a carboxylic acid, an acyl azide, an acyl nitrile, an aldehyde, an alkyl halide, an amine, an anhydride, an aniline, an aryl halide, an azide, an aziridine, a boronate, a carboxylic acid, a diazoalkane, a haloacetamide, a halotriazine, a hydrazine, an imido ester, an isocyanate, an isothiocyanate, a maleimide, a phosphoramidite, a reactive platinum complex, a sulfonyl halide, and a thiol group; and

wherein  $S_C$  is independently selected from the group consisting of an amino acid, a peptide, a protein, a tyramine, a carbohydrate, an metal chelating moiety, a nucleoside, a nucleotide, an oligonucleotide, a nucleic acid, a hapten, a psoralen, a drug, a hormone, a lipid, a lipid assembly, a polymer, a polymeric microparticle, a biological cell, and a virus.

14. The compound according to Claim 11, wherein one of said  $R^{15}$  or  $R^{16}$  is an aromatic or heteroaromatic ring system having 1-2 fused rings that is optionally substituted one or more times by  $C_1$ - $C_6$  alkyl,  $C_1$ - $C_6$  perfluoroalkyl, cyano, halogen, carboxylic acid, sulfonic acid, or halomethyl.
15. A compound having a formula:



wherein  $R^1$ ,  $R^2$ , and  $R^6$  are independently selected from the group consisting of hydrogen, cyano, halogen, carboxylic acid, sulfonic acid  $C_1$ - $C_6$  alkyl,  $C_1$ - $C_6$  alkoxy, aryl, heteroaryl,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl or alkoxy is optionally substituted by carboxylic acid, sulfonic acid, or halogen and said aryl or heteroaryl is optionally substituted one or more times by  $C_1$ - $C_6$  alkyl,  $C_1$ - $C_6$  perfluoroalkyl, cyano, halogen, azido, carboxylic acid, sulfonic acid, or halomethyl;

or  $R^1$  in combination with  $R^2$  forms a fused aromatic or heteroaromatic ring that is optionally sulfonated one or more times, or said ring is substituted by  $-L-R_x$  or  $-L-S_C$ ;



5  $R^3$  and  $R^4$  are independently selected from the group consisting of hydrogen,  $C_1-C_6$  alkyl, an aromatic or heteroaromatic ring,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, hydroxy, or halogen and said aromatic or heteroaromatic ring is optionally substituted one or more times by  $C_1-C_6$  alkyl,  $C_1-C_6$  alkoxy,  $C_1-C_6$  perfluoroalkyl, cyano, halogen, carboxylic acid, sulfonic acid, or halomethyl;

10 or  $R^2$  in combination with  $R^3$ , or  $R^3$  in combination with  $R^4$ , forms a 5- or 6-membered alicyclic ring;

15  $R^5$  is independently selected from the group consisting of hydrogen, methyl, carboxymethyl,  $C_2-C_6$  alkyl, aryl, heteroaryl,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen and said aryl or heteroaryl is optionally substituted one or more times by  $C_1-C_6$  alkyl,  $C_1-C_6$  perfluoroalkyl, cyano, halogen, carboxylic acid, sulfonic acid, or halomethyl;

or  $R^4$  in combination with  $R^5$ , or  $R^5$  in combination with  $R^6$ , forms a 5- or 6-membered alicyclic ring;

20 one of X and E is O, S,  $NR^8$ , or  $CR^{1'}=CR^{2'}$ , and the other is absent;

wherein  $R^8$  is independently selected from the group consisting of hydrogen, methyl, carboxymethyl,  $C_2-C_6$  alkyl,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen; and

25  $R^{1'}$  and  $R^{2'}$  are independently selected from the group consisting of hydrogen, cyano, halogen, carboxylic acid, sulfonic acid,  $C_1-C_6$  alkyl,  $C_1-C_6$  alkoxy, aryl, heteroaryl,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl or alkoxy is optionally substituted by carboxylic acid, sulfonic acid, or halogen and said aryl or heteroaryl is optionally substituted one or more times by  $C_1-C_6$  alkyl,  $C_1-C_6$  perfluoroalkyl, cyano, halogen, azido, carboxylic acid, sulfonic acid, or halomethyl;

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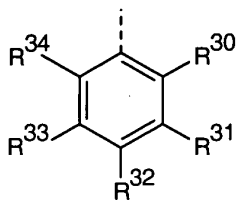
$R^{20}$  and  $R^{21}$  are independently selected from the group consisting of hydrogen, cyano, halogen, carboxylic acid, sulfonic acid,  $C_1$ - $C_6$  alkyl,  $C_1$ - $C_6$  alkoxy, aromatic or heteroaromatic ring,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl or alkoxy is optionally substituted by carboxylic acid, sulfonic acid, or halogen said aromatic or heteroaromatic ring is optionally substituted one or more times by  $C_1$ - $C_6$  alkyl,  $C_1$ - $C_6$  perfluoroalkyl, cyano, halogen, carboxylic acid, sulfonic acid, or halomethyl;

J is O or  $NR^{37}R^{38}$ ;

wherein  $R^{37}$  and  $R^{38}$  are independently selected from the group consisting of hydrogen,  $C_1$ - $C_6$  alkyl, aryl, heteroaryl,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen; or  $R^{37}$  in combination with  $R^{38}$  forms a saturated 5- or 6-membered heterocycle that is a piperidine, a morpholine, a pyrrolidine or a piperazine, wherein said heterocycle is optionally substituted by methyl, carboxylic acid, or a carboxylic acid ester of a  $C_1$ - $C_6$  alkyl;

or  $R^{37}$  in combination with  $R^{20}$ , or  $R^{38}$  in combination with  $R^{21}$ , or both, form a 5- or 6-membered ring that is saturated or unsaturated, and is optionally substituted by one or more sulfonic acids, or  $C_1$ - $C_6$  alkyl that is optionally substituted by sulfonic acid;

Q is N or  $CR^{28}$ , wherein  $R^{28}$  is independently selected from the group consisting of hydrogen, F, CN, carboxylic acid, a carboxylic acid ester of a  $C_1$ - $C_6$  alcohol, a  $C_1$ - $C_6$  alkyl,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen; or  $R^{28}$  comprises a formula



wherein  $R^{30}$ ,  $R^{31}$ ,  $R^{32}$ ,  $R^{33}$  and  $R^{34}$  are independently selected from the group consisting of hydrogen, F, Cl, Br, I, sulfonic acid, carboxylic acid, CN, nitro, hydroxy, azido, amino,

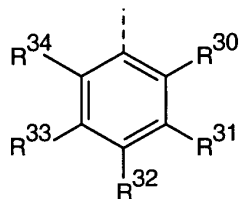
- hydrazino, C<sub>1</sub>-C<sub>18</sub> alkyl, C<sub>1</sub>-C<sub>18</sub> alkoxy, C<sub>1</sub>-C<sub>18</sub> alkylthio, C<sub>1</sub>-C<sub>18</sub> alkanoylamino, C<sub>1</sub>-C<sub>18</sub> alkylaminocarbonyl, C<sub>2</sub>-C<sub>36</sub> dialkylaminocarbonyl, C<sub>1</sub>-C<sub>18</sub> alkyloxycarbonyl, C<sub>7</sub>-C<sub>18</sub> arylcarboxamido, -L-R<sub>x</sub> and -L-S<sub>C</sub>, wherein said alkyl or aryl portions of said R<sup>30</sup>, R<sup>31</sup>, R<sup>32</sup>, R<sup>33</sup> and R<sup>34</sup> are optionally substituted one or more times by substituents selected from the group consisting of F, Cl, Br, I, hydroxy, carboxylic acid, a carboxylic acid ester of a C<sub>1</sub>-C<sub>6</sub> alcohol, sulfonic acid, amino, C<sub>1</sub>-C<sub>6</sub> alkylamino, C<sub>2</sub>-C<sub>6</sub> dialkylamino and C<sub>1</sub>-C<sub>6</sub> alkoxy; or a pair of adjacent R<sup>30</sup>, R<sup>31</sup>, R<sup>32</sup>, R<sup>33</sup> and R<sup>34</sup> substituents when taken in combination, form a fused 6-membered aromatic ring that is optionally further substituted by carboxylic acid; and
- wherein L is a covalent linkage;
- R<sub>x</sub> is a reactive group; and
- S<sub>C</sub> is a conjugated substance.
16. The compound according to Claim 15, wherein said Q is N.
  17. The compound according to Claim 15, wherein said J is O and said Q is CR<sup>28</sup>.
  18. The compound according to Claim 17, wherein one of said R<sup>5</sup>, R<sup>21</sup>, R<sup>30</sup>, R<sup>31</sup>, R<sup>32</sup>, R<sup>33</sup>, and R<sup>34</sup> is -L-R<sub>x</sub> or -L-S<sub>C</sub>.
  19. The compound according to Claim 15, wherein
 

said R<sup>3</sup> and R<sup>4</sup> are each methyl;

R<sup>1</sup> is H or a sulfonic acid;

R<sup>6</sup> is H; and

J is NR<sup>37</sup>R<sup>38</sup>.
  20. The compound according to Claim 19, wherein Q is CR<sup>28</sup> and R<sup>28</sup> has the formula



wherein one of R<sup>30</sup>, R<sup>31</sup>, R<sup>32</sup>, R<sup>33</sup>, and R<sup>34</sup> is -L-R<sub>x</sub> or -L-S<sub>C</sub>; and

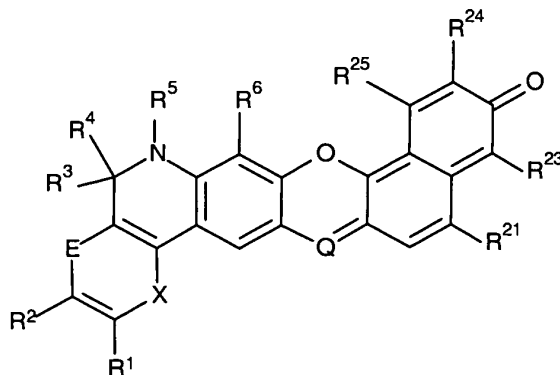
5 wherein L is a single covalent bond, or L is a covalent linkage having 1-20 nonhydrogen atoms selected from the group consisting of C, N, O, P, and S, and

wherein R<sub>x</sub> is independently selected from the group consisting of an acrylamide, an activated ester of a carboxylic acid, an acyl azide, an acyl nitrile, an aldehyde, an alkyl halide, an amine, an anhydride, an aniline, an aryl halide, an azide, an aziridine, a boronate, a carboxylic acid, a diazoalkane, a haloacetamide, a halotriazine, a hydrazine, an imido ester, an isocyanate, an isothiocyanate, a maleimide, a phosphoramidite, a reactive platinum complex, a sulfonyl halide, and a thiol group; and

10 wherein S<sub>C</sub> is independently selected from the group consisting of an amino acid, a peptide, a protein, a tyramine, a carbohydrate, an metal chelating moiety, a nucleoside, a nucleotide, an oligonucleotide, a nucleic acid, a hapten, a psoralen, a drug, a hormone, a lipid, a lipid assembly, a polymer, a polymeric microparticle, a biological cell, and a virus.

21. A compound comprising a formula

20



wherein  $R^1$ ,  $R^2$ , and  $R^6$  are independently selected from the group consisting of hydrogen, cyano, halogen, carboxylic acid, sulfonic acid  $C_1$ - $C_6$  alkyl,  $C_1$ - $C_6$  alkoxy, aryl, heteroaryl,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl or alkoxy is optionally substituted by  
5 carboxylic acid, sulfonic acid, or halogen and said aryl or heteroaryl is optionally substituted one or more times by  $C_1$ - $C_6$  alkyl,  $C_1$ - $C_6$  perfluoroalkyl, cyano, halogen, azido, carboxylic acid, sulfonic acid, or halomethyl;

or  $R^1$  in combination with  $R^2$  forms a fused aromatic or heteroaromatic ring that is  
10 optionally sulfonated one or more times, or said ring is substituted by  $-L-R_x$  or  $-L-S_C$ ;

$R^3$  and  $R^4$  are independently selected from the group consisting of hydrogen,  $C_1$ - $C_6$  alkyl, an aromatic or heteroaromatic ring,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, hydroxy, or halogen and said  
15 aromatic or heteroaromatic ring is optionally substituted one or more times by  $C_1$ - $C_6$  alkyl,  $C_1$ - $C_6$  alkoxy,  $C_1$ - $C_6$  perfluoroalkyl, cyano, halogen, carboxylic acid, sulfonic acid, or halomethyl;

or  $R^2$  in combination with  $R^3$ , or  $R^3$  in combination with  $R^4$ , forms a 5- or 6-membered  
20 alicyclic ring;

$R^5$  is independently selected from the group consisting of hydrogen, methyl, carboxymethyl,  $C_2$ - $C_6$  alkyl, aryl, heteroaryl,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen and said aryl or  
25 heteroaryl is optionally substituted one or more times by  $C_1$ - $C_6$  alkyl,  $C_1$ - $C_6$  perfluoroalkyl, cyano, halogen, carboxylic acid, sulfonic acid, or halomethyl;

or  $R^4$  in combination with  $R^5$ , or  $R^5$  in combination with  $R^6$ , forms a 5- or 6-membered  
30 alicyclic ring;

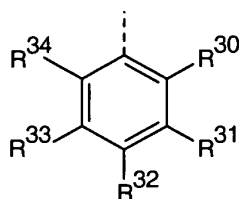
one of E and X is O, S,  $NR^8$ , or  $CR^1=CR^2$ , and the other is absent;

wherein  $R^8$  is independently selected from the group consisting of hydrogen, methyl, carboxymethyl,  $C_2-C_6$  alkyl,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen; and

5  $R^{1'}$  and  $R^{2'}$  are independently selected from the group consisting of hydrogen, cyano, halogen, carboxylic acid, sulfonic acid,  $C_1-C_6$  alkyl,  $C_1-C_6$  alkoxy, aryl, heteroaryl,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl or alkoxy is optionally substituted by carboxylic acid, sulfonic acid, or halogen and said aryl or heteroaryl is optionally substituted one or more times by  $C_1-C_6$  alkyl,  $C_1-C_6$  perfluoroalkyl, cyano, halogen, azido, carboxylic acid, sulfonic acid, or halomethyl;

10  $R^{21}$ ,  $R^{23}$ ,  $R^{24}$ , and  $R^{25}$  are independently selected from the group consisting of hydrogen, cyano, nitro, halogen, carboxylic acid, sulfonic acid,  $C_1-C_6$  alkyl, aromatic or heteroaromatic ring,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, or halogen said aromatic or heteroaromatic ring is optionally substituted one or more times by  $C_1-C_6$  alkyl,  $C_1-C_6$  perfluoroalkyl, cyano, halogen, carboxylic acid, sulfonic acid, or halomethyl;

15  $Q$  is  $N$  or  $CR^{28}$ , wherein  $R^{28}$  is independently selected from the group consisting of hydrogen,  $F$ ,  $CN$ , carboxylic acid, a carboxylic acid ester of a  $C_1-C_6$  alcohol, a  $C_1-C_6$  alkyl,  $-L-R_x$  and  $-L-S_C$ , wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen; or  $R^{28}$  comprises a formula



25 wherein  $R^{30}$ ,  $R^{31}$ ,  $R^{32}$ ,  $R^{33}$  and  $R^{34}$  are independently selected from the group consisting of hydrogen,  $F$ ,  $Cl$ ,  $Br$ ,  $I$ , sulfonic acid, carboxylic acid,  $CN$ , nitro, hydroxy, azido, amino, hydrazino,  $C_1-C_{18}$  alkyl,  $C_1-C_{18}$  alkoxy,  $C_1-C_{18}$  alkylthio,  $C_1-C_{18}$  alkanoylamino,  $C_1-C_{18}$  alkylaminocarbonyl,  $C_2-C_{36}$  dialkylaminocarbonyl,  $C_1-C_{18}$  alkyloxycarbonyl,  $C_7-C_{18}$

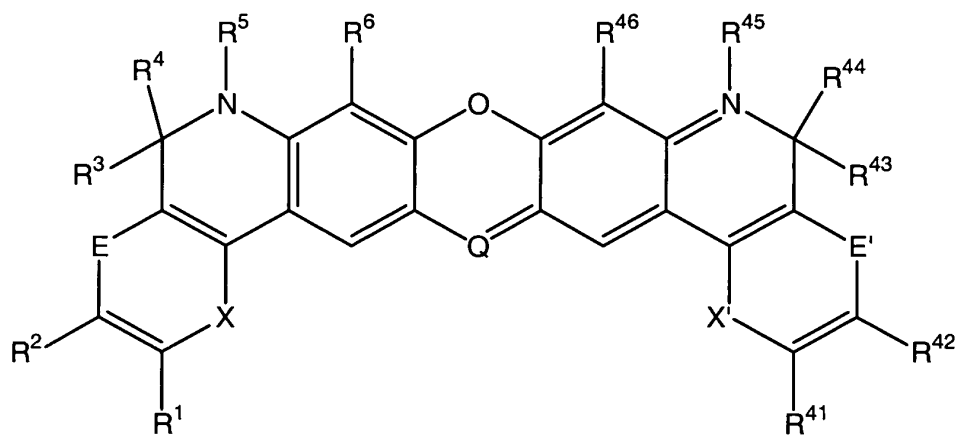
arylcarboxamido, -L-R<sub>x</sub> and -L-S<sub>C</sub>, wherein said alkyl or aryl portions of said R<sup>30</sup>, R<sup>31</sup>, R<sup>32</sup>, R<sup>33</sup> and R<sup>34</sup> are optionally substituted one or more times by substituents selected from the group consisting of F, Cl, Br, I, hydroxy, carboxylic acid, a carboxylic acid ester of a C<sub>1</sub>-C<sub>6</sub> alcohol, sulfonic acid, amino, C<sub>1</sub>-C<sub>6</sub> alkylamino, C<sub>2</sub>-C<sub>6</sub> dialkylamino and C<sub>1</sub>-C<sub>6</sub> alkoxy; or a pair of adjacent R<sup>30</sup>, R<sup>31</sup>, R<sup>32</sup>, R<sup>33</sup> and R<sup>34</sup> substituents when taken in combination, form a fused 6-membered aromatic ring that is optionally further substituted by carboxylic acid; and

wherein L is a covalent linkage;

R<sub>x</sub> is a reactive group; and

S<sub>C</sub> is a conjugated substance.

22. A compound having a formula:



wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>6</sup>, R<sup>41</sup>, R<sup>42</sup>, and R<sup>46</sup> are independently selected from the group consisting of hydrogen, cyano, halogen, carboxylic acid, sulfonic acid C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, aryl, heteroaryl, -L-R<sub>x</sub> and -L-S<sub>C</sub>, wherein said alkyl or alkoxy is optionally substituted by carboxylic acid, sulfonic acid, or halogen and said aryl or heteroaryl is optionally substituted one or more times by C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> perfluoroalkyl, cyano, halogen, azido, carboxylic acid, sulfonic acid, or halomethyl;

or R<sup>1</sup> in combination with R<sup>2</sup>, or R<sup>41</sup> in combination with R<sup>42</sup>, or both, forms a fused aromatic or heteroaromatic ring that is optionally sulfonated one or more times, or said ring is substituted by -L-R<sub>x</sub> or -L-S<sub>C</sub>;

5

R<sup>3</sup>, R<sup>4</sup>, R<sup>43</sup>, and R<sup>44</sup> are independently selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>6</sub> alkyl, an aromatic or heteroaromatic ring, L-R<sub>x</sub> and -L-S<sub>C</sub>, wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, hydroxy, or halogen and said aromatic or heteroaromatic ring is optionally substituted one or more times by C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> alkoxy, C<sub>1</sub>-C<sub>6</sub> perfluoroalkyl, cyano, halogen, carboxylic acid, sulfonic acid, or halomethyl;

10

or R<sup>2</sup> in combination with R<sup>3</sup>, or R<sup>42</sup> in combination with R<sup>43</sup>, or R<sup>3</sup> in combination with R<sup>4</sup>, or R<sup>43</sup> in combination with R<sup>44</sup>, or any combination thereof, forms a 5- or 6-membered alicyclic ring;

15

R<sup>5</sup> and R<sup>45</sup> are independently selected from the group consisting of hydrogen, methyl, carboxymethyl, C<sub>2</sub>-C<sub>6</sub> alkyl, aryl, heteroaryl, -L-R<sub>x</sub> and -L-S<sub>C</sub>, wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen and said aryl or heteroaryl is optionally substituted one or more times by C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>6</sub> perfluoroalkyl, cyano, halogen, carboxylic acid, sulfonic acid, or halomethyl;

20

or R<sup>4</sup> in combination with R<sup>5</sup>, or R<sup>5</sup> in combination with R<sup>6</sup>, or R<sup>44</sup> in combination with R<sup>45</sup>, or R<sup>45</sup> in combination with R<sup>46</sup>, or any combination thereof, forms a 5- or 6-membered alicyclic ring;

25

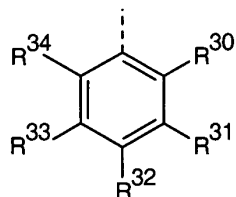
wherein one of said E, E', X' and X is O, S, or NR<sup>8</sup>, provided that E and X or E' and X' are not both present;

30

wherein R<sup>8</sup> is independently selected from the group consisting of hydrogen, methyl, carboxymethyl, C<sub>2</sub>-C<sub>6</sub> alkyl, -L-R<sub>x</sub> and -L-S<sub>C</sub>, wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen; and



Q is N or CR<sup>28</sup>, wherein R<sup>28</sup> is independently selected from the group consisting of hydrogen, F, CN, carboxylic acid, a carboxylic acid ester of a C<sub>1</sub>-C<sub>6</sub> alcohol, a C<sub>1</sub>-C<sub>6</sub> alkyl, -L-R<sub>x</sub> and -L-S<sub>C</sub>, wherein said alkyl is optionally substituted by carboxylic acid, sulfonic acid, amino, or halogen; or R<sup>28</sup> comprises a formula



wherein R<sup>30</sup>, R<sup>31</sup>, R<sup>32</sup>, R<sup>33</sup> and R<sup>34</sup> are independently selected from the group consisting of hydrogen, F, Cl, Br, I, sulfonic acid, carboxylic acid, CN, nitro, hydroxy, azido, amino, hydrazino, C<sub>1</sub>-C<sub>18</sub> alkyl, C<sub>1</sub>-C<sub>18</sub> alkoxy, C<sub>1</sub>-C<sub>18</sub> alkylthio, C<sub>1</sub>-C<sub>18</sub> alkanoylamino, C<sub>1</sub>-C<sub>18</sub> alkylaminocarbonyl, C<sub>2</sub>-C<sub>36</sub> dialkylaminocarbonyl, C<sub>1</sub>-C<sub>18</sub> alkyloxycarbonyl, C<sub>7</sub>-C<sub>18</sub> arylcarboxamido, -L-R<sub>x</sub> and -L-S<sub>C</sub>, wherein said alkyl or aryl portions of said R<sup>30</sup>, R<sup>31</sup>, R<sup>32</sup>, R<sup>33</sup> and R<sup>34</sup> are optionally substituted one or more times by substituents selected from the group consisting of F, Cl, Br, I, hydroxy, carboxylic acid, a carboxylic acid ester of a C<sub>1</sub>-C<sub>6</sub> alcohol, sulfonic acid, amino, C<sub>1</sub>-C<sub>6</sub> alkylamino, C<sub>2</sub>-C<sub>6</sub> dialkylamino and C<sub>1</sub>-C<sub>6</sub> alkoxy; or a pair of adjacent R<sup>30</sup>, R<sup>31</sup>, R<sup>32</sup>, R<sup>33</sup> and R<sup>34</sup> substituents when taken in combination, form a fused 6-membered aromatic ring that is optionally further substituted by carboxylic acid; and

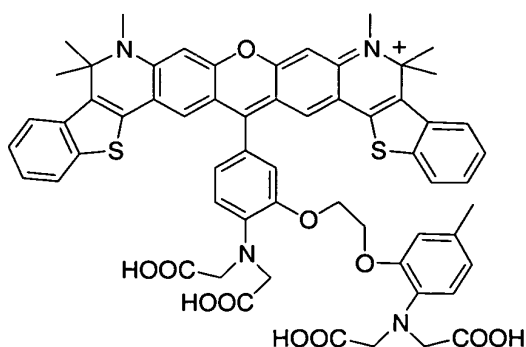
wherein L is a covalent linkage;

R<sub>x</sub> is a reactive group; and

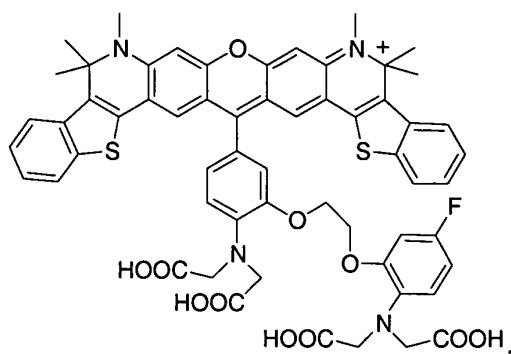
S<sub>C</sub> is a conjugated substance;

with the proviso that at least one of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>8</sup>, R<sup>28</sup>, R<sup>30</sup>, R<sup>31</sup>, R<sup>32</sup>, R<sup>33</sup>, R<sup>34</sup>, R<sup>41</sup>, R<sup>42</sup>, R<sup>43</sup>, R<sup>44</sup>, R<sup>45</sup> and R<sup>46</sup> is a conjugated substance.

23. The compound according to Claim 22, wherein E and E' are each S; R<sup>1</sup> in combination with R<sup>2</sup> form a aromatic ring and R<sup>41</sup> in combination with R<sup>42</sup> form an aormatic ring.
24. The compound according to Claim 23, wherein said conjugated substance is  
 5 independently selected from the group consisting of an amino acid, a peptide, a protein, a tyramine, a carbohydrate, a metal chelating moiety, a nucleoside, a nucleotide, an oligonucleotide, a nucleic acid, a hapten, a psoralen, a drug, a hormone, a lipid, a lipid assembly, a polymer, a polymeric microparticle, a biological cell, and a virus.
- 10 25. The compound according to Claim 24, wherein said conjugated substance is a metal chelating moiety wherein said metal chelating moiety is optionally substituted by a reactive group.
26. The compound according to Claim 25, wherein said metal chelating moiety is BAPTA.
- 15 27. The compound according to Claim 26, wherein said R<sup>28</sup> is said BAPTA.
28. The compound according to Claim 27, wherein said reactive group is selected from the group consisting of a carboxylic acid, a succinimidyl ester of a carboxylic acid, a  
 20 maleimide, a cadaverine, a benzophenone, an aryl azide and a diazirine.
29. The compound according to Claim 27, wherein said compound is according to formula



25 or



30. The compound according to Claim 28, wherein said compound is according to formula

